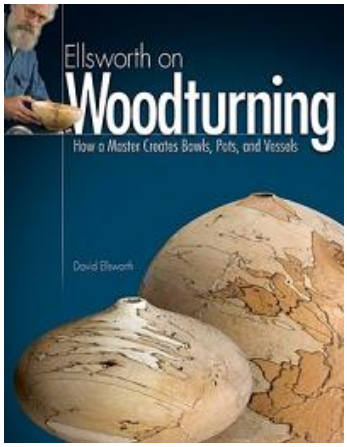
Tools and Techniques - Basic Bowl Turning – John Thorson
August 2012 Zumbro Valley Woodturners Club Presentation

Reference



We'll be referring to the bowl turning section of David Ellsworth's "**Ellsworth on Woodturning**" book during this demo.

NOTE: We have a copy of this great reference in the club library if you don't have one on your shelf at home.

Tools used, detailed discussion later…

1) **Necessary** - Most turners will agree that for basic bowl turning you can get along very well with only one gouge – a swept-back grind on a ½ flute bowl gouge.

2) **Desirable** - There are times when the finish can be improved by a 'finer' nose profile. I use a 3/8 inch flute bowl gouge with a swept back grind in my finishing cuts. Jimmy Clewes' favorite ¼ inch gouge is too whippy for my technique.

3) **Optional** - Standard grind bowl gouge can be used very effectively on the inside bottom 1/3 of the bowl to get a smooth cut, a tool with ½ inch or more flute helps reduce vibration caused by overhang, nose profile not as sensitive in this cut.

4) **Very Optional** - Big bowls or tough roughing out jobs call for a bigger gouge. For me a 5/8 inch flute with a swept-back grind is as much heft as I need in situations where I have a 14 inch or larger diameter bowl or very out-of-round blank.

The Cuts / Techniques Used with References to David's Book…

Scraping cut, no bevel rubbing, fairly closed flute

Roughing - page 115 - shaft horizontal using lower wing, degree the flute is open varies on the cut, can be used in push and pull cuts, a catch will move down and 'away' from wood due to horizontal shaft. Used to rough profile the outside and inside of the bowl.

The roughing cut can be used as a 'lower wing only' cut with a fairly closed flute or with tip and forward part of lower wing with a somewhat more open flute as shown in the Jimmy Clewes videos.

Flattening - page 118 - shaft horizontal, cut with lower wing, can be used in push and pull cuts, keep flute 'closed' to avoid too aggressive of a cut or it will catch.

Finishing - shear scraping cut- page 123 - cut with edge at 45 degrees (not at 45 in this photo) to surface with lower wing, push and pull cuts, keep 'closed' flute

Slicing or Peeling cut, no bevel rubbing, somewhat open flute

Rough profile - page 116 – lower shaft 20 to 30 degrees from horizontal, flute open to less than 45 degrees, cut uses tip and lower wing, can be used in push and pull cuts on wet or dry wood

Finishing shear slicing cut - Beginners do not attempt the “shear slicing” finishing cut done with the wing only as shown in several videos... work on your push cut instead. No photo will be provided here or demonstrated due to past bad personal experiences (bowl-destroying catches) with this cut. David Ellsworth uses the shear scraping cut to finish the bowl surface and has been quoted in interviews to say he leaves the bur on the edge after grinding to get a cleaner cut.

Push cut, constant bevel contact

Final profile - page 127 - flute open 45 degrees, cut with tip and wing in direction of the cut - roughing cut to the left shown here will involve a bit of the left wing and terminate left of the tip. Amount of 'wing' used determines aggressiveness of the cut. I use a bit of downward angle to the shaft but this cut can be done with a horizontal shaft.

Finishing - page 128 – shaft horizontal, flute vertical (read warning and solution below), cut with tip opposite of the direction of the cut (left of tip used on a cut to the right), a very light cut only, catch danger on wing if too aggressive of a cut.

WARNING: Attempting this cut in front of an experienced turner prompted them to say "Few turners can do that cut safely!" At that point I heard the gory details of how easy it is to catch a wing with this cut.

Solution: This turner then encouraged me to use "lighter cut" variations of the push cut described earlier using the tip and wing in the direction of the cut. I use this as my finishing cut on the inside and outside of a bowl both when wet and when dry and get a very smooth surface.

More Details on Bowl Gouges

From the “Ask Dale” column on the Woodturning Design web site (http://www.woodturningdesign.com/askdale/14/14.shtml) a great response by Dale to a beginner’s question on gouges.

***** The bold “Comment” text inserted below has been added by me to (a) call attention to specific points, (b) expand on the answer provided or (c) just encourage our discussion.

The major difference between a bowl gouge and a spindle gouge is the shape and depth of the flute. The flute of a spindle gouge is circular and shallow, while the flute of a bowl gouge is a modified open U-shape.
Comment: U, V, elliptical, etc. more on this later

For spindle work, the grain of the wood is always parallel to the axis and the grain orientation does not change as the work turns. The chisel is always cutting downhill and the cutting action is across the grain. Most of the work is less than 3" in diameter which allows chisels to be shallow and thinner in cross-section because the spindle gouge does not need to be supported for long distances over the tool rest.

Bowl turnings are mounted on a faceplate or a chuck, which usually orients the wood so the grain is perpendicular to the turning axis. Whenever possible, the work is turned from the face. The grain direction will vary and is changing continuously as the work turns. Some end grain tear out is inevitable, but a narrow gouge, freshly sharpened and with a smaller nose radius, will minimize tear out.
Comment: The gouge’s nose profile is influenced by narrowness of the gouge and the flute grind. A ‘finer’ nose profile will greatly reduce or even eliminate tear out.

Bowl gouges are frequently ground in various configurations with variations in the profile and bevel length. The preferred cut with a bowl gouge is a bevel rubbing cut. What determines the grinding angle for a bowl gouge is the type of bowl you are going to make and whether you will still be able to maintain bevel contact.
Comment: The angle of the grind also affects how forces related to the cut are projected into the bowl surface, more on this after we look at some diagrams.

You will see from the four illustrations in Diagram A (taken from Allan Batty's booklet Woodturning Notes) what determines the angle for grinding the tool.

Diagram A

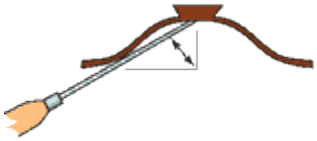


Fig. 1

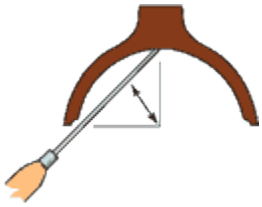


Fig. 2

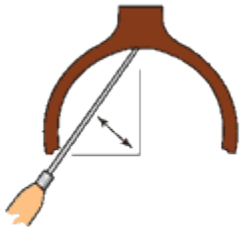


Fig. 3

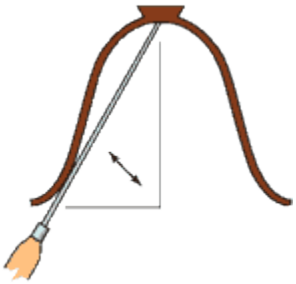


Fig. 4

Fig. 1 – As this is a shallow type of bowl, there are no restrictions placed on the gouge by the wall of the bowl, therefore none placed on the angle of the tool.

Fig. 2 – With this bowl, the wall restricts the gouge movement. As the depth does not exceed the radius, an angle of 45° would be ideal to maintain bevel contact throughout the cut.

Fig. 3 – Here the restriction becomes greater as the depth of the bowl has now exceeded the radius which, in turn, would require a shorter bevel angle of approximately 55°. This would allow the bevel to contact right to the bottom of the bowl.

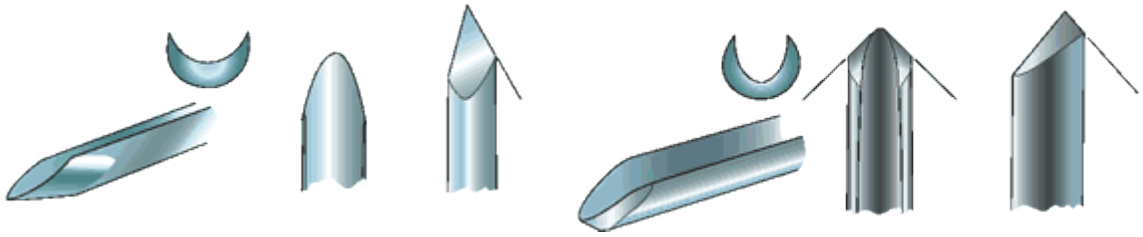
Fig. 4 – Now the depth has increased even further, which requires an even shorter angle, in this case approximately 60° to 65°, to allow successful bevel contact.

You can see that the determining factor is the type of bowl you want to make. An angle between 45° to 55° would be a good working compromise.

Comments:
Some would way 50-60 degrees is a 'usable' bevel angle, others prefer 40-50 degrees. I find that 45 works best for most cuts, for me. When dealing with the finish cuts on the bottom of the bowl 60 degrees on a fairly 'standard' grind works better… for me.

Beyond loss of bevel contact – Look at the diagrams above again and imagine a 'line of force' going straight down the bevel. You can see how significant the difference in the grind angle is in terms of induced vibration in the side wall of the bowl. You want your loads going 'towards the chuck / solid core' as much as possible. The load passed into the bowl from a scraper is always 'directly out' from the tool and that is why using a scraper at the rim is asking for a catch.

Diagram B



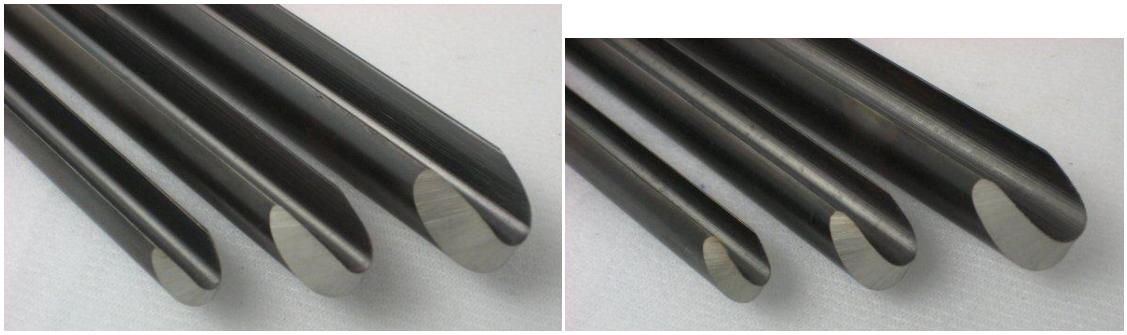
Spindle Gouges Bowl Gouges

For most work, the bowl gouge will extend further over the tool rest than a spindle gouge will (as illustrated in the figures in Diagram B). This requires a heavier bar of steel with more mass to overcome or reduce vibrations.

In normal use of these bowl gouges, one will cut as well as the other and both will produce excellent results. Turners will use different profiles, bevel lengths, and bevels swept back or ground with a steep angle. All are trying to make a bevel rubbing cut using a sharp tool with a flat or slightly hollow ground bevel. Most gouges are sharpened as shown in Diagram B or are modifications of these grinds.

My addendums to this article:

A) The following images come from the Thompson Lathe Tools website showing how the V and U grind change the nose profile for 3/8, 1/2 and 5/8 inch flutes. V shaped flute on left with U shaped flute on right. The shape of the flute affects nose profile as well as ability to clear chips during the cut which makes this a 'what works best for you' decision. If you compare at the 3/8 U shaped flute with the 1/2 V shaped flute you'll see about the same nose profile. I find it easier to 'go down a size' rather than go to the V shaped flute.



Note: an elliptical grind adds curve to the wings of the flute and some folks like Glenn Lucas swear this is an advantage when rubbing the bevel and when scraping.

B) Why 'standard grind' for me on the inside-bottom of the bowl? I tried David Elsworth's 85 degree sweptback grind and did not have the same control of the cut that I do with a 60 degree standard grind (5-10 degree sweep). I also find that nose profile does not matter as much here so I can use a large tool with a flute size of ½ effectively.

Here is a picture of the Mike Mahoney 'bottom feeder' as advertised the Craft Supplies USA catalog that follows a similar approach only with very little sweep to the wings at all:

C) See the bowl gouge you are interested in personally in the store or borrow one from a friend to really 'test it out'.

See example of flute grind difference from Hamlet tools below; both are ½ inch Masterflute (elliptical) grinds but the two have a very different nose profile.